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THE Convention of the American Institute of Architects, which was held in Boston last week, was neither very largely attended nor exciting; but it was not wanting in animation and interest. It had the advantage of an unusually symmetrical programme, in which the discussions were well balanced between practical and artistic questions, and divided the time with executive business and sight-seeing. We may take it for granted that our readers know what the programme was; it was published a week or two ago in our summary. Unfortunately the three days which custom assigns for these conventions give hardly time enough for the amount of business and discussion that naturally falls to them. In spite of morning and evening sessions, and afternoon meetings, the final impression is that many subjects were passed over in less time than they deserved. Since, however, architects are a busy class, and are apt to feel quite as busy as they are, it would probably be difficult to persuade them to give more time than custom demands. The executive business accomplished in the sessions was for the most part not of very general interest. A considerable change in the method of collecting and managing the revenue of the Institute was adopted at the recommendation of the Committee on Finance, subject to the approval of the Chapters. The reduction of assessments which was made at the last convention had been found to compel recourse to the guaranty fund subscribed for this year; and it was voted to change the method of levying the assessments. A direct assessment was to be levied only on the members at large, and Fellows in Chapters; Associates in Chapters, who have no votes in the convention, being passed over, and the remainder of the budget raised by a tax on Chapters in ratio of membership. For this, and for other duties, including the consideration of increase of membership, a Committee of Ways and Means was appointed. The question of the Washington Monument was raised; and after considerable discussion, in which a prevailing opinion was developed, that while the present movement for finishing it should be opposed, the Institute ought not to be too forward with its advice, the matter was laid on the table. There was considerable discussion of the action due towards honorary members who might undertake to participate in professional practice; a matter which was left to the Board of Trustees, with the opinion, evolved in debate, that it would be better that such members should make application to become active members. A resolution was passed appealing to the Government to undertake tests of materials and methods of construction which claimed to be fire-proof. A valuable suggestion, which was appropriately referred, was made by the Rhode Island Chapter, that a report be prepared on the various building materials supplied by the country. There were some changes in the officers, of which the chief was the resignation of its secretary, Mr. Bloor, whose zeal, activity, and knowledge of the business of the Institute, has been its reliance for a number of years; and the election of Mr. Charles F. McKim of New York, as his successor.

THE professional subjects which had been assigned for discussion were arranged in combination with the excursions of the days for which they were appointed. Thus the visit to the new buildings of the "burnt district" was supplemented by the papers and discussion on fire-proof construction; the papers on religious architecture, by the examination of the churches on the Back Bay land; and those on colonial architecture, by the visit to old houses in Cambridge. As often happens, the discussions failed, on the whole, to bear out the interest of the essays that were read. The papers on fire-proof construction, read at the first evening's session, differed considerably in treatment of the subject,—Mr. Schumann's discussing directly the effects of heat on iron, and its protection; Mr. Lienau's chiefly the use of brick; Mr. Wight's the protection of iron from fire; and Mr. Hatfield's giving a *résumé* of the losses from fire in the country for a generation past, and of the value and proper use of wood,—but all agreed substantially in condemning the ordinary methods of fire-proof as inadequate, and in urging the necessity of protecting iron from fire by some more resisting material. A discussion of interest followed, but without adding any thing of importance to what was said in the papers. The essays on religious architecture, on the second evening, were more general and less specific than we had hoped; and the discussion on them had to give way to the pressure of executive work. The absence of Mr. McKim deprived the convention of the opening paper on colonial architecture. Mr. Peabody's, on the same subject, was published in the *Architect* of last week; this subject also was obliged to pass without debate. The papers on ventilation, by Mr. Briggs and Mr. Pfeiffer, and Col. Waring, were of unusual interest; the first leading to the unexpected conclusion that it was not desirable, but probably pernicious, in our climate, to add artificial moisture to the dry and heated air which our furnaces send up in winter.

PRESIDENT WALTER'S suggestive address is given on another page of this paper. Its remarks upon the education and qualifying of architects are very timely. We were glad to see that at least two of the Boston papers welcomed the opening of the convention in the same vein, with an appeal to architects to give the public some means of distinguishing between the trained and the untrained. The Boston *Advertiser* said,—

"There is one matter that ought to receive, and we presume will receive, the serious attention of this council of architects. Within the past year there have been an extraordinary number of accidents to buildings that were constructed under the supervision of architects supposed to be entirely capable. . . . A succession of calamities like this tends strongly to make the public suspicious of the qualifications of men who represent the profession. . . . There ought to be some way of professional recognition, that would be a reasonably safe assurance to the public that a man presuming to be an architect was reasonably expert."

This subject was brought before the Institute, and the Committee on Education was instructed to examine it, and report at the next convention what means could be adopted for securing the necessary qualification. It is an extremely difficult matter, and one that has often been considered in the Institute without leading to any practical solution. So long as no definite interest in it was to be looked for from the public, there seemed to be no hope of accomplishing any thing. Now we may hope that the opportunity has come. It belongs to those architects who profess an active interest in the standing of their profession, to take the initiative in the effort to define its proper limits; but if the public fails to support them with its interest, and in case of need by legislation, their task will be a difficult one, perhaps impossible.

IF there is one time more opportune than another to insist on a due technical education for architects, it is when the impression is fresh in the public mind of the disasters of the past four months; when on the one hand the architectural profession, just rising into prominence in the country, is called upon to show a good title to the position it claims; and when the country, on the other hand, exchanging its older buildings everywhere for more important ones of novel construction, which it wishes to be permanent, has need more than ever of a capable and trustworthy body of men to put in charge of its work. We may well say then in the words of

Mr. Walter's address, that "the interests of architects demand the adoption of some such measures and the interests of the public demand it more."

THERE is certainly something attractive in the project of bringing Cleopatra's Needle to New York; and now that we have the promise of a single responsible man, and not the chances of a general subscription to trust to, the first great obstacle is removed. There are those to whom it seems a case of Elgin-like spoliation; and the feeling that would leave the grand old monolith to pass the rest of its days undisturbed is not without an appeal to one's sympathy. But we may remember that the obelisk was long ago taken away from its original surroundings, and that even the Roman building to adorn which it was removed has utterly perished, so that it stands bereaved of all its proper companions. There is no splendid and perfect building to be despoiled by its removal; no people who look back with pride to see the history of their ancestors embodied in it, and who will feel themselves plundered should it be taken away. It stands, on the contrary, a witness to the desolation of repeated conquests, exiled and among aliens in its own country; while here the very contrast between its antiquity and the newness of every thing around it could not fail to bring it some degree of reverence. If the permission of the Khedive is really assured, and there seems reason to think that this is the case, there is a fair prospect of actually seeing it in New York. It would be a notable achievement if Mr. Dixon succeeded in transporting both the obelisks safely over the seas; and yet the fact that the first has been recovered after going adrift gives good promise of success, and even failure in the case of the first would probably not discourage the second attempt. It would be worth while, however, we should think, to put off the effort to cross the ocean with it till summer, when there will be a reasonable chance of a smooth passage. Already the people of New York are exercised in the choice of a site for it. Of those that we have seen suggested, Madison Square seems at first thought the most promising. The *Tribune* makes the reasonable suggestion that now the funds for transporting the obelisk are assured without subscription, those who were prepared to contribute might profitably turn their efforts to the building of a suitable pedestal for the Bartholdy statue. Perhaps there is some other wealthy and public-spirited New Yorker who will make his contribution to the splendor of his city in that way.

THE Keely motor, after being pretty well forgotten by everybody except the persons who were at work upon it, or had invested money in it, has come again into notice within a few weeks past. The *Scientific American* having lately disparaged his invention, Mr. Keely, who has all along been working hard at it, supported by some sanguine capitalists, wrote a letter to the *New York Herald* a month ago, inviting an examination of it by some capable scientific man or men, whom the *Herald* should appoint, — at its own expense, we presume. The *Herald* accepted the challenge; and since then the daily papers have been more or less busy with the motor, some talking hopefully of it, some denouncing it as a delusion, and others as a fraud. The *Philadelphia Bulletin*, writing with apparent knowledge and judgment, says that while Mr. Keely has probably made some discovery of interest, it is not likely to lead to any practical benefit, because his machine is too costly, is dangerous, and needs a scientific expert to handle it safely; because it is uncontrollable, uncertain in its action, and subject to rapid deterioration from the violence of the force it employs; because, finally, its action is intermittent, and cannot be kept up for more than a few minutes at a time. This is the most intelligent-looking account we have seen of the case, and is probably the best we shall have till the *Herald's* examiner makes his report.

THE machine, so far as it is seen, is an enormously strong reservoir, called a "multiplicator," into which is introduced a small quantity of air at a tension of from one-third to two-thirds of one atmosphere, and water from a hydrant. The inventor claims that there is no use of heat, electricity, chemicals, or galvanic action. Persons who have seen the performance of the motor, report that a simple movement of a lever causes the generation of a vapor or gas, that escapes at a pressure of from three thousand to ten thousand pounds, increasing with the pressure of the air that is supplied. It is said that the escaping gas or vapor shows neither taste, odor, nor humidity; also that it condenses or dissolves in water. How far the observation of these not easily reconciled qualities is to be trusted, we cannot say. It looks as if the motor might be one of the class of machines of which a great number have been invented, but of which none except fire-arms have proved to be practically useful; which depend on the formation of gases by rapid decomposition in confined spaces, that is, by explosion, and as if the decomposition of water were the means employed. Such explosions have not yet been found controllable on a scale that makes them remarkable for any considerable amount of work, though many attempts have been made. On the other hand, it is whispered that the motor has really been discovered to be nothing more than a means for exerting enormous pressure through small space on confined air, by the multiplied pressure of successive hydraulic rams; in which case it would of course be utterly useless as motive power. We are loth to believe, however, that the inventor should either hope to cheat the public, or be able to cheat himself, with such a transparent fraud. Mr. Keely's reported claim to have discovered a means of generating force out of nothing, discredited his invention from the beginning. It is not likely that he has stumbled (we use the word advisedly) on any new force, or on any means of generating force without the consumption of a known equivalent. Since the discovery of the dynamical equivalent of heat and the convertibility of force, the amount of power which may be obtained from any given material or combination is a subject of sure calculation; and there is no likelihood that a new source has been discovered. When we remember that our greatest mechanical invention, the steam-engine, only utilizes as yet say a tenth of the force which its fuel supplies, we are inclined to think that the most hopeful way to economy is in increasing the efficiency of our present appliances.

THE CONVENTION OF THE INSTITUTE.

PRESIDENT WALTER'S ADDRESS.

FELLOWS AND ASSOCIATES: —

We convene to-day for the purpose of holding the Eleventh Annual Convention of the American Institute of Architects.

Through the goodness of Divine Providence, which it becomes us to recognize with gratitude, we come together with the added experience of another year, to transact the current business of the Institute, and to consider such questions as may come before us, having a bearing on the interests of the profession, and the general diffusion of sound views and proper conceptions relating to the science and practice of our art.

We have the privilege of meeting, on this occasion, in the metropolitan city of New England, — a city distinguished alike for progress in the arts of civilization, and for the culture, refinement, and commercial enterprise of its people. We held our Fifth Convention in this city, and we here begin to-day the second decade of these annual re-unions. We are glad to meet again with our Boston friends; and I sincerely hope that our convocation may prove successful in promoting the progress of architectural science, the well-being and efficiency of the Institute, and the general interests of the profession.

During the past year, opportunities for architectural development have been very much curtailed by the business depression which has so long rested upon our country, and, indeed, upon all centres of civilization throughout the world. It is nevertheless true, that the profession of architecture has never presented so encouraging an aspect as it does to-day. Wherever buildings of importance have been erected, an independence of thought has been manifested in details, as well as in the grouping of leading features, that more than indicate the processes of intelligent study.

An innate feeling of irresistible progress seems to have pervaded all our commercial centres, developing itself in palatial structures possessing far more artistic elegance than the more pretentious buildings erected in the recent past.

In various sections of the country, extensive edifices, both public and private, including several churches of magnificent

proportions and costly finish, are now in progress of construction; thus characterizing the present era as one of decided progress. In our principal business thoroughfares, we find rich, effective, and novel styles of building, adapted to every conceivable species of enterprise; while on every hand we observe unmistakable evidence of progress in the arts of design, and in the sciences which relate to construction.

These remarks must not, however, be understood to imply a wholesale approval of all that has been done under the name of architecture: — by no means. While we find much to admire, we find more to condemn. We cannot, however, fail to observe that the proportion of unscientific building throughout the country is growing less every year; hence it becomes an important question for the Institute to consider, how a better taste in design, and more substantial methods of construction, may still further be promoted, even in the plainest and most inconsiderable structures.

It is a great mistake, to suppose that taste and solidity are necessarily expensive properties in building. The materials required for a small house, or a large one, may be so disposed as to produce pleasing effects, and at the same time give strength and permanency to the structure, without enhancing the cost, or interfering with the uses for which it is designed; and we all know that in more elaborate buildings taste and skill are far less expensive than ignorance and incapacity.

During the past decade architecture has taken a wide departure from the processes of thought that formerly held in check the spirit of inspiration in design; and the season which has just closed may be considered as having been more productive of originality in the conception of architectural forms, than any previous period of the world's history.

It is not necessary for me, on the present occasion, to allude specifically to the works which have been executed during the past year, as the most of the considerable buildings now in process of construction were commenced previous to our last convention, and were at that time graphically described in the opening address of Mr. A. J. Bloor, — an address which brings up our art through the mutations of a hundred years with historic accuracy, and which does full justice to the great centennial anniversary of our national independence.

In view of this valuable contribution to architectural history throughout the century, I deem it proper not to detain you with any descriptive account of the works now in progress, but rather to look at our art, in the light in which we find it to-day.

Architecture as now practised has evidently ceased to be confined to certain schools, founded upon principles of law and order, evolved from the fragmentary remains of nationalities which have long since passed out of existence. The advancement of the physical sciences, and the development of the æsthetic nature in man, have wrought astounding changes in the processes of architectural thought, — changes which admonish us not to go to the other extreme, but rather to guard against becoming too eclectic in our practice, and letting extravagant freaks of fancy carry us, in our conceptions of material forms, beyond "the eternal fitness of things," and the irrevocable principles of beauty, — principles which can never be violated without producing effects always to be deprecated.

From a retrospect of the past, it is evident that under all circumstances, — in war and in peace, in prosperity and in adversity, — the progress of the American mind in the arts of civilization is not only constant, but cumulative. It is worthy of note in this connection, that while the savagery of our recent internecine war was ravaging the country with unsparing hand, dealing death and destruction to our dearest interests, art lived, and architecture never ceased to develop itself in forms of beauty and of use. It is nevertheless true, that the advancement of the arts of peace is greatly promoted by public tranquillity and commercial prosperity; but it is equally true, that art manifests a constant progress, let the circumstances of the times be what they may.

It should be remarked, that progress in architecture means the acquirement of knowledge in all that pertains to architectural science; it is therefore obvious, that a high degree of excellence in that art can only be effectively promoted by insisting on a thorough course of education on the part of those who propose to enter the profession.

A uniform system of study should be faithfully pursued by every student, first in the college or technological institute, and then in the office of some professional architect, whose certificate, duly countersigned by order of the American Institute of Architects, after a proper examination under such rules as it may hereafter be deemed expedient to adopt, shall be his warrant for practising his art; and those only who shall thus have been systematically inducted into the profession should be recognized as fitted to pursue its practice and assume its responsibilities. The interests of architects demand the adoption of some such measures, and the interests of society demand it more.

A large portion of those who assume the title of *architect*, and publish themselves as such, have never pursued any systematic course of architectural study, and are wholly unfit to take upon themselves the responsibilities of the profession: it is therefore important to adopt some means by which such persons may be distinguished from architects who have been properly trained, educated, and prepared for the practice of their art. The system of certificates or diplomas, as suggested, would partially meet the case; but more than this will be required wholly to abate the evil.

The study of the sciences, upon which a proficiency in architecture mainly depends, having become a distinctive department in many of our colleges and technological institutes, students desiring to prepare for the practice of that art now have opportunities to acquire a far more thorough training in the courses of study which pertain particularly to architecture, than could possibly be acquired in an architect's office.

I may be permitted to say in this connection, that the influence exerted by the Massachusetts Institute of Technology, in the proper training of art students, is putting Boston far in advance of any other city in the Union; and we may hope that ere long opportunities will be afforded at all our seats of learning, for the special training of students intending to pursue architecture as a profession.

Those who go through a collegiate course of study in the sciences which underlie architecture, with a view of becoming architects, undoubtedly lay the best possible foundation for excellence in the profession. They are thus prepared for the attainment of a more practical knowledge, which, it should be remarked, can only be acquired in the office of an architect, where the every-day practice of the profession affords facilities for the completion of a thorough architectural education, which no amount of theoretical training alone could ever accomplish.

I should not feel justified in omitting to say something on this occasion, in relation to the very objectionable process of procuring designs for public works, by open or general competition, — a process to which architects of standing in the profession will rarely submit.

The subject has often been brought before the Institute; but thus far, the evils of the system have never been so treated as to secure satisfactory results.

The *modus operandi* of such competitions is bad from beginning to end. The work to be competed for is usually put in charge of a committee, or commission, as the case may be, who issue a general invitation to architects, by advertisement or otherwise, to exercise their skill in preparing designs, specifications, and estimates for the proposed structure. The inducement held out to them to enter the lists, consists of an offer of some *three* or *four* premiums, to be awarded to such as may be adjudged to have submitted the most meritorious designs. But what is to become of the rest of the competitors? Every one of them must necessarily have devoted no small portion of time to study, and to personal labor, in the preparation of his designs, besides incurring expenses always incident to such an undertaking; none, however, but the happy few to whom the premiums are awarded, receive any show of compensation, the remaining candidates for the prizes being "left out in the cold," with the unenviable satisfaction of enjoying "their labor for their pains." Architects should let all such competitions severely alone; they are unqualifiedly objectionable in whatever light we may view them; they deprive the public of the use of the best talent in the profession; and they greatly injure all who compete for the prizes, and prove unsuccessful, subjecting them to a worse than useless expenditure of time and brains and money, and often to a greater loss, — a loss of self-respect.

As a general rule, no architect should consent to perform

professional service without a reasonable compensation. "The laborer is worthy of his reward."

Competition of any kind is no more necessary in architecture than it is in other learned professions; but public opinion being in its favor, it remains for architects to seek to remove, as far as may be, the evils attending it.

The only just and equitable method that appears to be practicable to obtain competitive designs for a public work, is for the authorities intrusted with its management to select a given number of architects, and to extend to each a special invitation to furnish designs in competition, under a schedule of graded premiums, corresponding in number with the competing architects; care being taken that the lowest premium is sufficient to cover the expense of producing the design, so that no competitor could be an actual loser by the operation.

In all such competitions the drawings should be made to a similar scale, and finished without coloring. After their reception by the building committee or commission, they should be submitted to a board of experts, consisting of at least *three* non-competing architects of acknowledged proficiency in the science of architecture, selected from the Fellows of the American Institute of Architects, and *two* civil engineers of undoubted skill in their profession. The board of experts thus constituted should examine the several designs; and whatever decision they arrive at, as to their relative merits, should be considered as final; and the competitor receiving the highest premium should be appointed architect of the building at the usual rate of compensation for his services.

By thus limiting competitions to a given number of selected architects; by referring the designs they submit to a board of experts of acknowledged skill; by awarding graded premiums, according to merit; and by appointing the competitor who receives the highest premium the architect of the proposed work, — the evils of competition may, in a great measure, be avoided.

The propriety of using our best efforts to bring about the establishment of a system somewhat in accord with the suggestions I have here ventured to make, cannot be doubted, in view of the fact that committees or commissions who usually have the management of our public works have, with but few exceptions, no knowledge whatever of the fitness of an architectural design for the purposes for which it is intended. They are in most instances, it is true, gentlemen of respectability, of general business qualifications, and of intellectual culture; but it is equally true that few, if any of them, have ever given architectural science the least intelligent attention. However unexceptionable they may be in their daily avocations, and whatever business tact they may have for conducting a public work, they cannot be expected to be capable of passing judgment on the merits of architectural designs, either as it regards the purposes for which they are intended, their æsthetic properties, or their principles of construction. It is therefore not only proper, but highly necessary, for all such committees or commissions to call in scientific skill to lead them in their decisions on matters so vitally connected with the well-being of society as the architectural fitness and propriety of its public edifices.

A correction of the evils which exist in the present methods of competition is rendered difficult by the want of a proper appreciation by the general public of what is due to the profession: the subject is one to which the Institute would do well to give serious consideration.

Permit me to allude to another subject that materially concerns the well-being of our profession: I refer to the propriety of cultivating a higher degree of professional etiquette among architects, the practice of which would undoubtedly lead to a better understanding of our art by the public, and to a higher appreciation of its professors. Very many architects, otherwise highly respectable in their calling, seem to be impelled by some irresistible power to criticise unsparingly the works of others. This is a most pernicious practice for any one to indulge in. To detract from the merits of the works of fellow-professors, in one of the noblest arts of civilization, cannot fail to lower the standard of the profession in the public estimation.

We designate our practising members *Fellows* and *Associates:* we mean by these terms, a vital principle of professional life; they imply *fellowship*, — not *enmity*. They mean in this connection, union of purpose in promoting the interests of the profession, and elevating it to its proper place in the public mind.

As to our individual ideas of the æsthetic handling of architectural subjects, these will necessarily be as different as our tastes, our cultivation, and our habits of thought, are different; but it is neither generous, modest, nor graceful for an architect, however eminent he may be in his profession, to detract from the works of others simply because they do not square with his own ideal standard.

Our late president, whose words of wisdom and sound logic have ever been grateful to us, said in his address at the opening of the First Annual Convention of the Institute, —

"We complain, and sometimes justly, of the irrelevant, and to say the least, disreputable criticisms of others. I say this because mere loose observations and remarks strike at the reputation of others, and sometimes do great and lasting injury to them. If we cannot speak in commendation of another's work, we will say nothing." Such words as these, coming as they do, from the Nestor of American architecture, are, in the language of Solomon, "like apples of gold in pictures of silver." Let us heed them.

In conclusion, gentlemen, permit me to say, that although the American Institute of Architects is complete in its organization, and its work thus far has been admirably done, we must bear in mind that *art* is progressive, that *we* are progressive, and that the *Institute* is, or ought to be, progressive: the work of to-day will not exonerate us from the work of to-morrow.

One of our most effective movements in the line of progress has been the establishment of local Chapters; but these must be sustained and encouraged, their membership increased, and their number multiplied, until all the centres of civilization throughout the land shall send to our annual gatherings representatives of similar branches of the Institute, alive with the energies of art, and imbued with the universal idea of progress. My own opinion is, that an important branch of our future labors will lie in this direction.

In a country of such vast extent as ours, we could not have succeeded without Chapters; they are the life-blood of our organization, vitalizing our existence, and imparting to it breadth and dignity. We are all members of chapters, as we are members of the Institute. By this dual relationship we are brought into harmonious accord, a spirit of emulation is promoted, and our extended and diversified interests are unified under a federal head. We have therefore important work to do in our respective bailiwicks, to which it becomes us to devote our best energies.

The respectability of the profession has already been greatly promoted by the establishment of the Institute, and we have a full share of the public confidence; if, therefore, we are true to our interests, it will not be long before we become a necessity of the age, and an honor to our country.

NEW PUBLICATIONS.

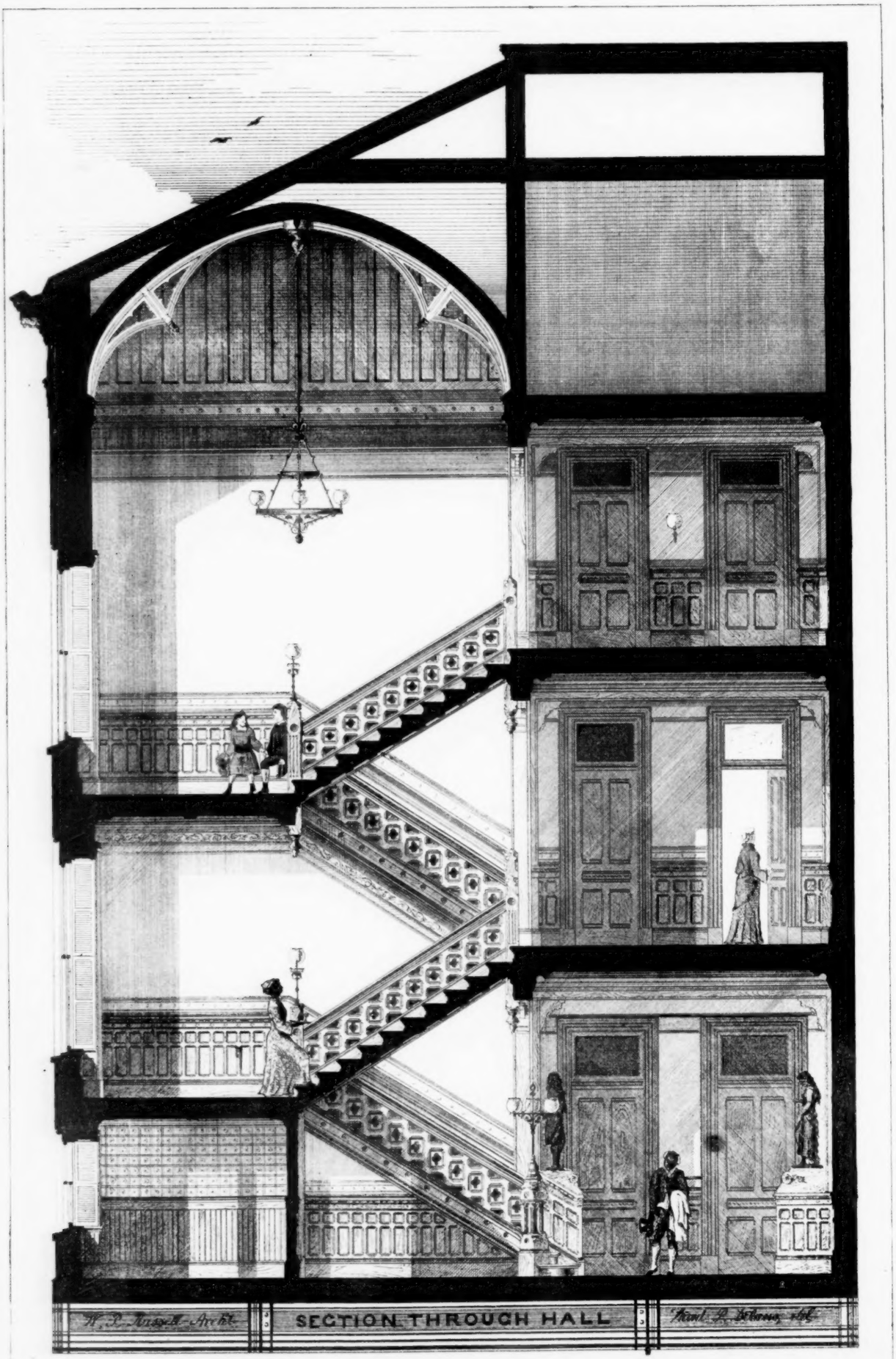
METALLURGICAL REVIEW.[1]

THE first number of this review (for September) is before us. It is admirably printed on clear, substantial paper, generously illustrated, and discusses, in a series of well-considered papers, a class of topics of the highest interest to the profession to which it is specially addressed.

The opening paper, by Professor Thurston of the Stevens Institute, on the mechanical treatment of metals, including hydraulic pressure applied to fluid metal in casting, rolling and forging, drop-forging, hydraulic forging, wire-drawing, — with and without annealing, — with the details of special improvements, and of the author's own experiments, is full of most useful matter. In some future number of the series of papers, of which this is the first on these topics, we shall doubtless see allusion to Professor Treadwell's researches in increasing the strength of metal for guns, a bit of credit we looked for under the head of "Rolling and Forging," or of "Wire-Drawing." This paper is followed by the carefully-prepared communication of Mr. Pechin on new iron-fields in Ohio, which promise the greatly cheapened production of pig-iron; and next by a paper on the Danks Furnace, by a practical furnace man. Mr. Williams points out the excellences and defects, and mentions his own improvements, while vindicating the importance of the invention.

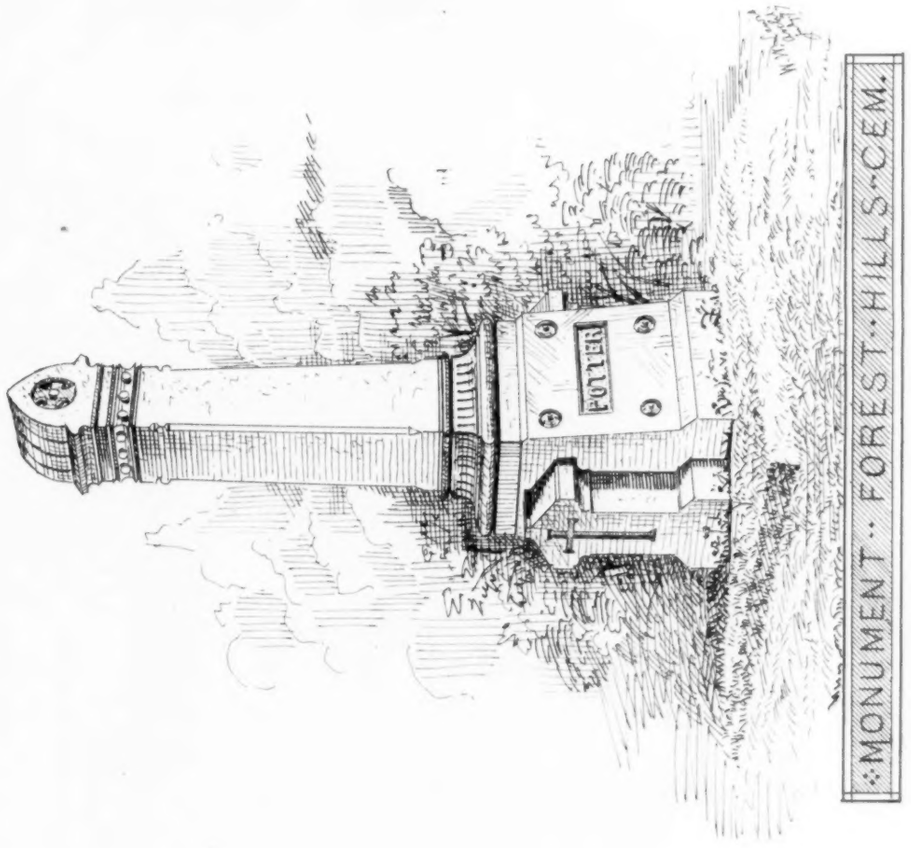
The article on steel brings to notice the vexed problem of the dependence of particular properties of steel and cast-iron on the minute shades of difference in the percentage of carbon. Mr.

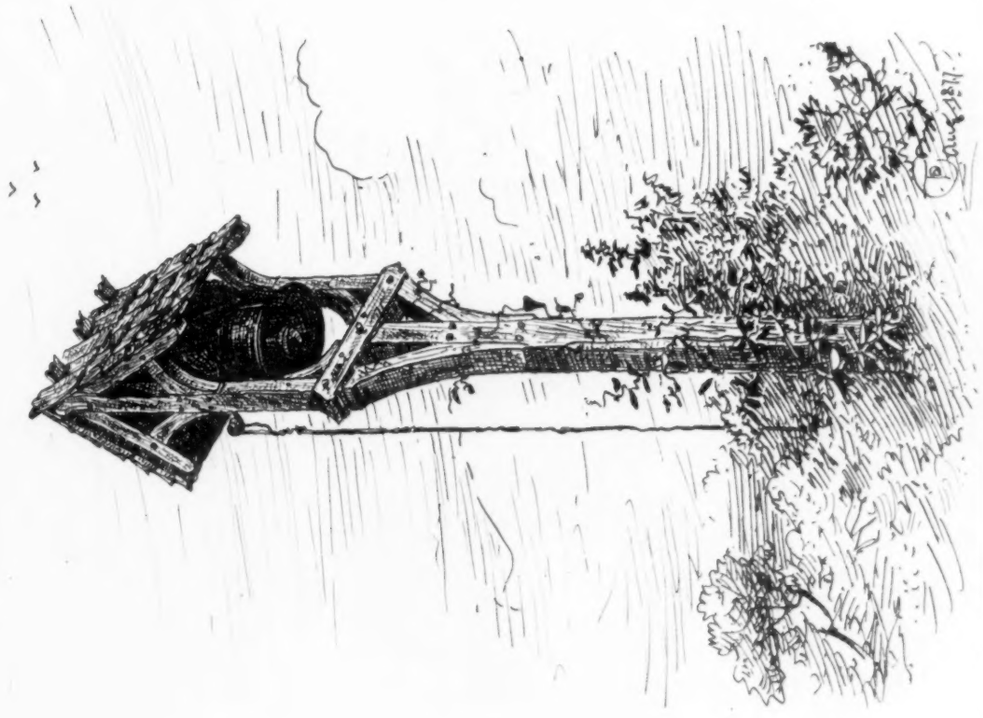
[1] METALLURGICAL REVIEW: a monthly journal devoted to subjects indicated by its title, published by David Williams at 83 Reade Street, New York.


SECTION THROUGH HALL

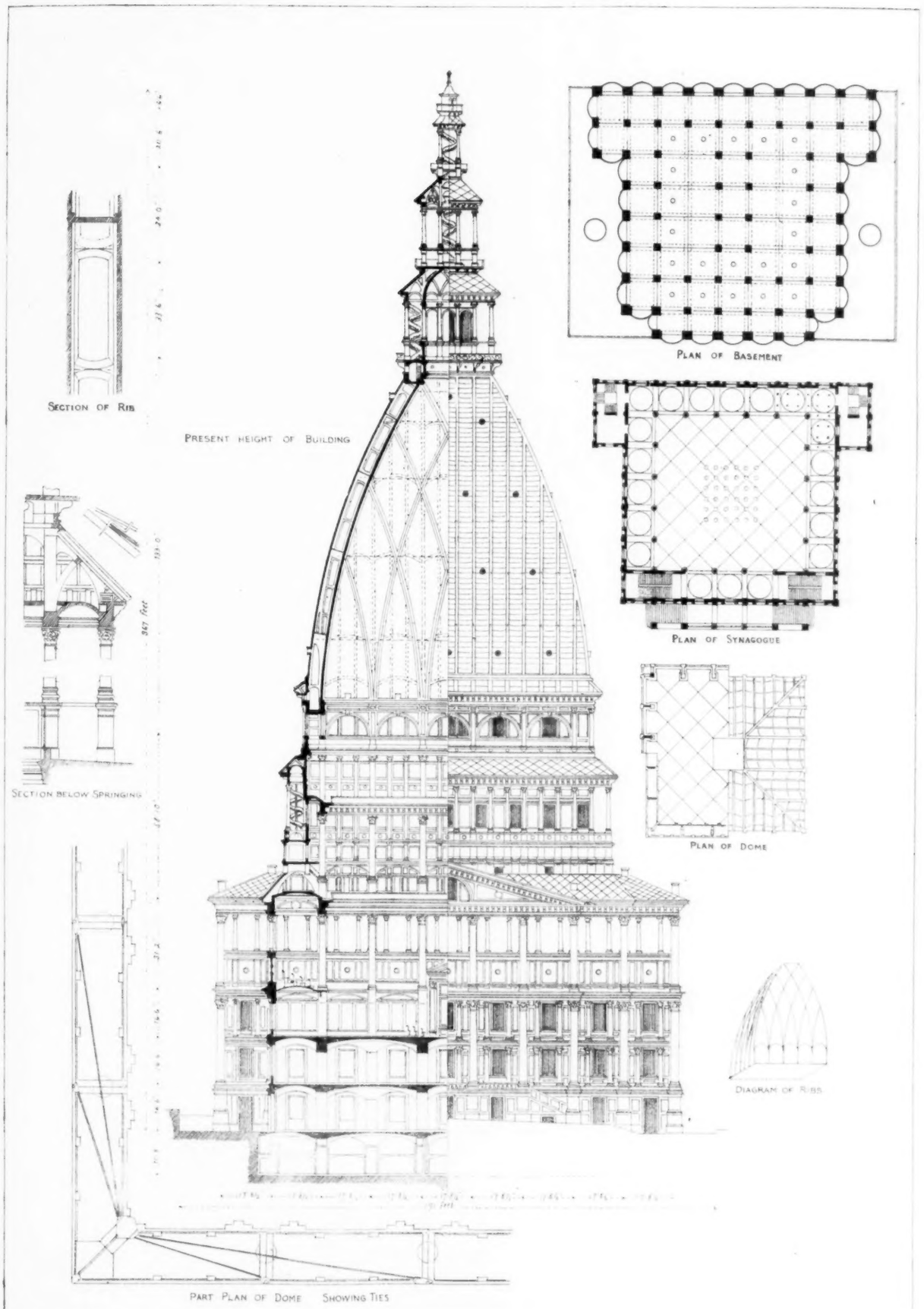
EXTENSION TO MESSRS CHENEY'S BLOCK HARTFORD CONN.

MESSRS GAMBRILL & RICHARDSON ARCHTS.





FARM BELL NEAR PHILADELPHIA
T. SCOPHILUS P. CHANDLER JR ARCHT



THE HELIOTYPE PRINTING CO. 330 Dartmouth St. Boston.

JEWISH SYNAGOGUE TURIN

CAV. A. ANTONELLI ARCHT

Metcalf is a practical worker of steel, and treats the subject in the style of an expert. His remark that "Every variation of one-tenth of one per cent (in the carbon) may be observed, and in high steels a difference of one-fortieth," in the properties of the steel, is fully sustained by the analytical results of Professor Langley, presented before the chemical section of the American Association for the Advancement of Science at its Buffalo meeting. The paper is full of interest.

An improved method of determining phosphorus in steel and iron is given. The deleterious influence of this impurity is so well known, that a method of increased accuracy will be welcomed by analytical chemists. There are other lesser articles, as that on "The Siphon Tap in Lead Smelting," "The use of Alloys of Silicon and Manganese in Casting Steel," "On Protection of Lining of Blast Furnaces," and several others that will not fail to interest the profession. The most original paper in the number is that of Henry Würtz, Ph.D., "On Elemental Iron and its Modifications." It is full of suggestion, and will be read with warm interest by students of the anomalies which present themselves to iron masters. We shall look with interest for the succeeding numbers, which are certainly promised in the large amount of work cut out in this paper, which the author calls introductory.

MAHAN'S INDUSTRIAL DRAWING, NEW EDITION.

MAHAN'S INDUSTRIAL DRAWING is a book too well known in architects' and engineers' offices to need description. In this new edition Professor Thompson has successfully endeavored to modernize certain portions which were beginning to appear antiquated, and to make the work more complete by additional material. New chapters are added on Tinting and Shading, Shadows, Isometrical Drawing, and Linear Perspective, besides two short and not very valuable chapters on Oblique Projection, and Construction of Regular figures; the regular figures consisting of various kinds of pavements, which might apparently be quite as well drawn by the application of ordinary methods. The chapter on Drawing Instruments is re-written, and includes descriptions and illustrations of the latest improvements in materials, which are selected and commented upon with excellent judgment; and in the chapter on Tinting and Shading there is much that is useful and practical. The new chapter on Shadows is clear and concise. Both in this and in the portion of the book which treats of projections, which has been altered from the earlier editions only by re-arrangement and the omission of a little unimportant matter, a change for the worse has been made in the notation, so that small Italic letters in the plates refer in the text sometimes to capitals and sometimes to small letters.

The chapter headed Isometrical Drawing starts with two or three pages on Isometric Projection, which we are told at the end is quite a different thing from isometric drawing, and then stops to compare this with the true projection of isometrically projected figures, which is different from either; and when after all this misplaced geometry we arrive at the real isometric drawing, we find what we should have known at the beginning, that it is a purely conventional method of delineation, having nothing to do with ground lines or vertical planes. Once reached, the problems are well arranged. The chapter might with advantage be longer, and should be carefully cleared of any thing tending to obscure the rules of so simple and so extremely useful a mode of drawing.

The chapter on Linear Perspective opens with a short and clear explanation of the theory of perspective, followed by a variety of easy problems, worked out by means of the vanishing points of diagonals and perpendiculars; an easy method to understand, and perhaps the best which can be adopted in dealing with small and simple objects. The problems are worked out clearly, and with a judicious progression from the easier to the more difficult; though the editor does not attempt to carry his readers beyond the simplest forms.

The illustrations seem to be lithographic reproductions of the original copper-plates, with several new plates added. They are coarsely printed, and the drawing of some of the new plates is far from good; as for instance the interlacing circles and guilloche ornaments in Pl. I ** which are but poor models for the student; and a figure in Pl. XXV., in which the perspective representation of a hexagon is made to have seven sides.

The print is clear, and the form of the book convenient, as the plates are bound in a separate pamphlet, inset into the volume of the text.

THE ILLUSTRATIONS.

EXTENSION OF THE CHENEY BLOCK, HARTFORD, CONN. MESSRS. GAMBRILL AND RICHARDSON, ARCHITECTS.

THIS extension, of brick, is connected with the block, which is of stone, but similar in style, by the bridge in the second story, shown on the right of our plate. The original design of the block was illustrated in the *New York Sketch-Book of Architecture* in 1875.

SECTION OF A STAIRCASE HALL. MR. W. P. RUSSELL, ARCHITECT.

This hall is in a building for Mr. A. Williams, at Charleston, S.C.

SKETCH FOR A FARM BELL-COTE. MR. T. P. CHANDLER, JUN., ARCHITECT.

MONUMENT IN FOREST HILLS CEMETERY. MR. W. WHITNEY LEWIS, ARCHITECT.

The monument is to be of white granite, certain parts of which will be polished.

THE JEWISH SYNAGOGUE AT TURIN. CAV. A. ANTONELLI, ARCHITECT.

See article in another column by Mr. R. P. Pullan. Both article and illustration are copied from the *Architect*.

CORRESPONDENCE.

PHILADELPHIA.

THE new Post Office progresses very slowly, as the labor force is small in comparison with the extent of the work. Only about eighty hands, principally the brick-layers who are laying the inner walls and backing up the external granite, of which almost the entire first story is laid, are at present employed. The granite work for the second story has nearly all been delivered on the premises, ready to be set, the cutting being all done at the Dix Island quarries. Mr. McArthur, the superintending architect, considers that the work might be completed within three years if the necessary appropriations could be depended upon. It is to be hoped that the new Congress will take early action on the deficiency which has been delaying the work, as it has been shown that the appropriation for the current year of $100,000 will not carry the building on to the point intended when the appropriation was made.

There was to have been a meeting of the Public Building Commission on Tuesday (16th) evening; but it was found necessary to postpone it until the last Tuesday of the month, on account of the lack of a quorum. Meanwhile the work on the actual building is at a stand-still, as it has been since last July, while in the quadrangle and outer enclosure is lying almost enough marble to complete it.

It is a curious feature of modern civilization that such time-honored landmarks as churches and grave-yards are made to give place to the requirements of business. A recent example of this is the old Central Presbyterian Church, a large building with the stereotyped Doric façade, one might almost say, without which, during the early part of the century, no church-building appears to have been considered complete. Here, as in many like instances, the congregation has been driven out of the neighborhood by the encroachments of business, and finally the church "goes west" after them; and at the same time its dead are packed off farther west to one or other of the suburban cemeteries. The new church-building, the design of Messrs. Collins & Autenreith, is located on the west side of Broad Street, north of Fairmount Avenue (formerly Coates Street), having a frontage of 84 feet and a depth of 140 feet; the back part of the lot impinging on the properties fronting on Ridge Avenue, gives an irregular angular plan to the Sunday-school and class rooms, which are in the rear of the church proper. The façade will be mainly of Trenton sandstone, with base course of Hummelstown stone; wrought-work of Ohio drab and brown stone; the roof-cornices of galvanized iron, and the tower-roofs slated; while the roof of church, being of a low pitch, will be tinned. The front shows three ample central doors, the heavily carved and crocketed canopies over which are supported by six polished granite columns from the Bay of Fundy. Above these is a broad triple window under separate arches supported by similar polished granite columns. The gable above is pitched at a rather low angle, and the decoration of the cornice, as also of the tower-cornice, is in galvanized iron. The front is flanked by towers on either side, that on the south being dwarfed, of three stages, and having a sort of truncated pyramidal roof. The tower on the north side reaches with its short spire, a height of 115 feet. The interior will allow an auditorium of 75 feet by 51 feet. The seats will be arranged on a theatral plan, and with the semicircular gallery will allow of somewhat over nine hundred sittings. The organ will be above and behind the pulpit. The general style of the work, especially the arches and mouldings, is Romanesque.

Meanwhile on the lot which was lately occupied by the old church at the corner of Eighth and Cherry Streets is building from the same architects' plans a group of five new stores, allowing a frontage on Eighth Street of about 17 feet 8 inches to each. Two alternate stores finish above with a pediment, while a portion of the corner-store runs up a story higher than the others in the wall, besides having a pyramidal roof above, which gives a certain unity of effect to the composition, while each store to a great extent preserves its individuality. The first stories are much the same as usual all along that thoroughfare of retail shops for the sale of dress goods; the old story of plate-glass set in the slightest frame-work of wood. Delicate columns and pilasters with incised patterns

[1] Industrial Drawing, by D. H. Mahan, late Professor of Civil Engineering, etc., in the U. S. Military Academy. Revised and Enlarged by Dwinel F. Thompson, B.S., Professor of Descriptive Geometry in the Rensselaer Polytechnic Institute, Troy, N.Y. New York: John Wiley & Sons, 1877. Price $3.50.

seem to support the walls above, which are of red pressed brick, with window heads and sills of Ohio drab stone, the heads having an incised ornament. Two string-courses of enamelled brick are introduced; and just below the galvanized iron cornice a more elaborate arrangement of the same bricks will be used, the colors being chiefly blues and browns. The interior of these stores will be arranged with a broad central stair at the rear, opening to a gallery, above which a sky-light and an ornamental window in the back wall will afford ample light to that portion of the building. Some new features for stores of this class are being introduced, such as ample toilet-rooms and dumb-waiters. Mr. George Watson is the contractor; and the work is to be completed by the first of the year, much to the relief of the locality, the streets adjoining being a trifle too narrow to conveniently accommodate the necessary encroachments of brick-piles and mortar-beds.

In the case of a mechanic's lien filed against the trustees of the Jefferson Medical College Hospital, Judge Thayer was last week asked to allow it to be amended by citing the trustees of the college instead of the hospital, as a number of names were added to the trustees of the former when the money was being raised to build the hospital, and it was not desired to throw the responsibility on these. He decided that the superfluous names might be stricken out; but would not allow the general change of substituting the one set of trustees for the other.

Fire-escapes have been put on some of the theatres, factories, and hotels; but most of the owners have paid no attention to the law requiring them to be put up, and nearly all of those who have complied seem to have endeavored to come within the requirements of the law at as low a cost as possible, and without much regard to usefulness in the emergency for which they are intended. Most of them are ladders constructed of iron rods or pipes, with an open platform at each story. These are so narrow that it would be impossible for two persons to pass, and those who are not accustomed to such heights (particularly women in the large mills) would be in case of fire unable to help themselves. The Academy of Music, with a few others, have put up a really useful fire-escape; which is a very plain two-feet-wide iron stairway, on the south wall, and leading from the dressing-room to the yard.

Why should not fire-escapes be used, in places where it is practicable to do so, as regular thoroughfares, and then in case of emergency every one would know where to find them, and how to use them?

Cincinnati.

Mr. James K. Wilson, architect, is now engaged upon a monument to be erected in Spring Grove Cemetery for John M. Mueller, Esq., well known as the owner of the Buena Vista (Ohio) freestone quarry. The design has for its model, or at at least is similar to, the temple of Vesta at Tivoli, and will be of the purest Corinthian in design. It is to be built of the best quality of the Buena Vista stone throughout. The rear end will start from the level of the lake, the roadway in front being about eight feet higher. The basement is to be of very large blocks, bedded only, with faces left as taken from the quarry. Above the basement, come the sixteen columns, twenty inches in diameter, and ten diameters high, fluted and resting on pedestals with balustrades; between the columns and the pilasters of the wall will be a footway three feet wide. The ceiling above these columns will be panelled. The diameter of the monument, taken at the columns, is twenty-five feet. The "cella" is twelve feet in diameter inside, in which is a circular stone stairway, communicating with the several stories. The entablature carries a balustrade upon which is another walk, or gallery. The "cella" is a full story above the order, and admits of another gallery from which a commanding view of the surrounding country may be had. The entire height above the lake, to the top of the statue that crowns the dome of the cella, is about a hundred feet. The catacombs, of which there will be thirteen to each tier, are of course in the basement, which is rectangular in plan.

THE JEWISH SYNAGOGUE AT TURIN.

[From the *Architect.*]

Turin, though a comparatively modern city, and one without a history, is not utterly destitute of attractions for the artist and archæologist. The artist, however, plods through its uninteresting thoroughfares, despairing of meeting with any building likely to produce a sensation of wonder, admiration, or even to excite his curiosity. Still even he need not go away disappointed; for if he will follow the Contrada del Po from the Piazzi di Castello, and take the second turning on the left, he will see towering before him a building which will render him breathless with amazement, — an edifice of brick, as yet unfinished, almost in a line with the front of the street, rising to a height of more than 240 feet, and apparently of such slender constructions that he will almost expect to see it fall while he gazes. When I first saw it three years ago I never expected to see it again. Yet it was commenced fourteen years ago, and has remained in its present unfinished state for about seven years, exposed to the elements; and up to the present moment has shown no signs of failure.

This extraordinary edifice was intended for a synagogue; but the Jewish community having exhausted their funds when the building was 124 feet short of its intended height, — 367 feet from the level of the pavement, — it has lately been sold to the municipality of Turin, and is to be turned into a museum. I visited every part of it in company with the Jewish custode, in whose charge it still remains. I came away convinced that as perfection in building consists in the attainments of the greatest results with the utmost economy of materials consistent with stability, this edifice approaches perfection in the science of construction more closely than any other in existence. Forty-eight piers about four feet square sustain a superstructure 130 feet square in plan and at present 240 feet in height. Thus the bases of support are of the smallest possible dimensions when compared with the superincumbent weight. Then, again, the mode of construction is "hardi" in the extreme; the roof is what may be called a four-sided dome. As to the architecture, it will not do to be hypercritical; for we know from sad experience that engineers' architecture is none of the best. There is not much to find fault with in the elevations. The plan is a square of about 130 feet. There are two main horizontal divisions in the fronts and sides of about equal heights when measured from the gutter of the lean-to roof which covers the lower division. The height of each is about 75 feet. The lower division has two orders of composite pilasters, with cornices and entablatures. There are eight pilasters on each face. On the near front there is a portico of six columns, approached by flights of steps at the sides. Below these divisions there is a basement. The spaces between the pilasters of the lower order are occupied by two ranges of windows. In the upper order there is a loggia, which has a light and pleasing effect. Above the lower division there is a lean-to roof running back about five feet. Over this roof there is the basement of a second loggia, which is to run round the building, and to have eighty granite columns, not yet fixed. This loggia is covered by a second steep lean-to, above which there is an attic with five semicircular arches between pilasters on each front. The cornice over these pilasters forms the line of the springing of the four-sided dome, at the height of 150 feet above the ground-line. This dome, which is extremely steep, is covered with plates of metal, apparently zinc. When completed it is to be surmounted by three cupolas, one above the other, measuring 100 feet in height.

In order thoroughly to comprehend the plan of the building, it will be well to draw a plan on paper, and to divide each side into eight parts, connecting the opposite points with lines, and thus forming sixty-four squares. Rub out the four interior points on the third and sixth lines, and draw lines to represent the external walls, and you will have a plan of the basement, ground, and first floors; each of these stories measures 17 feet 6 inches in height from floor to floor. The foundations for the piers, which are represented by the points on your drawing, are composed of tiles and puzzolana, and are carried down to a depth of 45 feet in a heavy sandy soil. The basement was to have been occupied by kitchens and offices; the ground-floor by a hospital and schools; the first floor by council-rooms for the rabbis. Each floor is sustained by the flattest vaults of brick-work ever seen; those of the two inner compartments are at least thirty feet in span, with a rise of less than three feet. These vaults are all strengthened by wrought-iron ties running through the building, on the upper surfaces of the brickwork. Massive granite staircases in the angles of the building lead to the second story, that of the synagogue itself. The landings are of granite, and of enormous size. I measured one thirty feet in length. The synagogue occupies the entire area of the square, the only piers being those at the sides which support galleries and the walls of the superstructure. This room is the highest in the world, being, although unfinished, 200 feet in height. Although the entire space is encumbered with scaffolding, the spectator when looking upwards is struck with amazement at the grandeur of the conception, and at the boldness of the construction; for he perceives that the dome is sustained by three rows of slender columns, six on each side, which stand upon the outer piers supporting the galleries.

Mouldings and other ornamental features are still wanting; but this is an advantage to the visitor, if an architect, for he is thus enabled to study the skeleton of the structure. The corridors which run round the inner area are vaulted, at the same height as the lower stories; viz., 17 feet 6 inches above the ground. At this height there is a series of flat arches, supporting the fronts of galleries for the women. On the piers which support these arches, there are Corinthian columns with entablatures ranging exactly with the upper pilasters on the exterior of the building. Between each column and outer pilasters there is a parabolic arch. From the sides of these transverse arches spring the rows of elliptical arches, running longitudinally round the square; and upon these rest two walls, — one, that of the basement of the upper loggia; the other the outer wall of the building, which supports the outer wall, or rather shell, of the dome. This is the peculiarity of construction before mentioned, — the upper main wall of the building thus rests upon a system of arches, and has no direct support from below, with outer and inner walls, or rather shelves, of brick. The inner shell, which is only half a brick in thickness, rests upon six columns on each side, and the outer shell on a wall which has no direct line of support beneath it, but which rests on a series of arches, in a manner which will be hereafter explained. I am con-

vinced that no committee — had the plans of the building been submitted in competition — no committee, even if composed of architects or engineers, would have ventured to accept this design, so impracticable does its execution appear when the sections are seen on paper. Fortunately, the Jewish community had confidence in the ability of the designer, — the engineer, Antonelli, of Turin; and the result has shown that their confidence was not misplaced, for he has produced a work which proves him to be a man of the highest talent. Nothing but the most accurate calculation, combined with years of experience, would have enabled him to carry out this extraordinary project. I say the experience of years; for this is not the work of a young man, but of an old man of genius — Antonelli is nearer eighty than seventy years of age. We think much of ourselves if we complete a Gothic spire of unusual height, or a vault of great span; but these are but puny works by the side of this gigantic synagogue. In fact, such a piece of construction is simply impossible in England; for in such a building, where the stability of the whole depends upon the most careful workmanship, it would not do to trust to the chance-work of builders, or to the possible negligences of clerks of works. Every brick in the building was set in cement, under the eyes of Antonelli or his immediate representative, who was, I believe, his son. How would such a systematic supervision answer with our five per cent mode of payment? The total cost of the work hitherto executed was the moderate sum of £24,000. What English architect could afford to accept £1,200 for five years' incessant superintendence of any one edifice, however much it might be likely to add to his reputation?

The dome, when seen in section, appears like an imitation of iron-construction in brick-work. It consists of two coverings or shells, five feet apart, the outer one brick thick — the inner only half a brick. Both of these have, however, inner ribs at short intervals. These shells are connected by what may be termed bonding arches, with stone heads, placed one above the other vertically, about twenty feet apart; and from them again spring longitudinal arches. The inner shell is strengthened by ribs a brick and a half in thickness, which rise from above the columns, and form acutely-pointed groining arches intersecting one another. Thus the whole dome is kept together by a complicated system of circulation. In addition, it is secured at the angles by iron ties, which connect the inner-angle pier with the two outer-angle ribs, and by longitudinal and transverse ties which run round the entire building and between the main points of support. Between these two shells a series of ladders will give access to the cupolas above the dome. At present, in order to reach the platform on the present summit of the edifice, it is necessary to ascend by the scaffolding in the interior. This is in no wise a perilous undertaking, and you are well rewarded for the toil of the ascent by the fine view of the city which you obtain, and by the opportunity thus afforded of examining the peculiarities of the construction. The custode informed me with a sigh, that his co-religionists, being unable to complete the synagogue, had lately sold it to the municipality for £6,000, quite a fourth of what it cost them, and that Antonelli was to have the satisfaction of completing his great work. Let us hope that he may live to see the completion of this, — one of the greatest works of genius the world ever saw.

R. P. PULLAN.

THE PARIS INTERNATIONAL EXHIBITION.

"THE progress in the works is so great," says a writer in the new English journal, *Trade Marks*, "that there is little doubt all will be finished in good time. Already our own and other commissions have possession of portions of their space. By the system of construction adopted, no sooner is a bay or section finished than it is roofed in, and as the window-frames are tinned, the labor of painting them is happily dispensed with. The various sections are all now distinctly visible, and the plan is remarkable in many points, — the first being that all the galleries present long vistas, with great width and height, whilst the arrangement of the parts is the simplest possible. In front, that is to say, facing the river, is a building which occupies the whole width of the site, and at the back is a corresponding building. In these are the principal entrance doors, and with one exception all the other exhibition-galleries connect these two together; consequently the latter form grand vestibules to the former. The plan is like that of the Escurial in Spain, — gridiron-shaped. The exception referred to is that of the fine-art galleries, which are not continuous, but form a broken line of handsome pavilions down the centre, with flower-beds between and around them. The advantages of the plan seem to be these: The machinery-galleries — the only section in which fire is required — are placed on the outside; next to these come the general galleries, occupying an immense space on each side; while the fine-art pavilions are not only isolated from each other and from the industrial galleries, but have a considerable space on each side between them and the latter — a capital safeguard against fire. This enclosed garden, with a very long arcade, and decorated façade on each side, French and foreign, will form a charming nucleus to the whole. Architecturally speaking, the coming Exhibition will far surpass any of its predecessors. The chief façades are very handsome, as are those in the garden already referred to. At each end of the fine-art pavilions are remarkably bold and handsome peristyles, each surmounted by three cupolas; these will protect the contents of the pavilions from dust, and, in a measure, also from heat and cold.

"The fine-art pavilions do not, however, occupy the whole of the central portion; the building in the middle, a large and handsome one, being devoted to the exhibits of the municipal authorities of the Department of the Seine and the city of Paris. The contents of this building will have great attraction for all who are in any way engaged in local government, as it will illustrate all the measures taken during more than a quarter of a century to change Paris from what it was to what it is at present. This collection will include models, plans, apparatus, and materials relating not only to operations connected with draining and sewage, road-making, keeping and irrigation, and the water supply, but also to common schools, colleges, schools of art, barracks, hospitals, infirmaries, and other public establishments of all kinds; while in the garden will be shown the various foreign plants specially cultivated for the decoration of the parks, squares, and promenades, which form such prominent features of Paris. The Municipal Exhibition is not to be limited even to these matters. For many years the authorities have had medals struck in commemoration of the erection of the principal new buildings. Thus there are medals of the Halles Centrales (the grand market of Paris), the new churches, the Tribunal of Commerce; the last two added to the collection being commemorative of the Church of St. Peter, erected at Montrouge, and of the reconstruction of the Palais de Justice, while one of the new Hôtel Dieu will be added this year. The archives of the municipality and the hospitals are to contribute historic documents, old maps and plans, seals, illuminations, miniatures, autographs, etc., of which the selection is now being made of the most rare or curious for exhibition, either bodily or by photograph. The Government has also sanctioned the necessary expenditure to enable the directors of the Meteorological Observatory, established within a few years at Montsouris, to fully illustrate the methods of observation adopted there, and to show the instruments and apparatus used in that important establishment.

"All who are connected with art industry in any way will rejoice that the Union Centrale, which has organized several of the most splendid exhibitions of specimens of industrial art ever offered to the public, is to have its special department, which will contain drawings, plans, and works in sculpture, to which prizes have been awarded since 1869; the art publications of the society; examples of old decorated tissues; photographs of ancient costumes, tapestry, objects of art, mostly from the East; also plaster models of geometric figures, architectural ornaments, from the most elementary to the most ornate, reproducing the chief elements of each style and period, and grouped with the special object of art-education, with hand-books used by the professors and teachers of schools of art. The models are being prepared by a sculptor, under the direction of the three secretaries of the Union.

"The works around the Exhibition are proceeding as rapidly as those within its boundaries. The quays are being piled to form solid roads, and, in some places, extended by means of timber structures. The foot-bridge for the public, in place of the Pont de Jena, which is devoted to the Exhibition, is commenced. This bridge is to be made from Passy to Grenelle, and will have support on the Isle des Cygnes, which lies between them. The special railway will run close to the Exhibition, and have a terminus at the Champ de Mars and the Trocadéro. It is being constructed by M. Saint-Yves; the engine and carriages resemble those of a steam tramway. The handsome structure, or Palais as it is called, on the Trocadéro, is devoted to the history of man — one wing being given to the ethnography of the nations beyond Europe, the central portion to the anthropological sciences, and the other wing to the history of art."

BLACKBOARDS FOR SCHOOLHOUSES.

EDITORS OF AMERICAN ARCHITECT.

Would you please inform me through the columns of your paper, or by letter, the best way to make blackboards for schoolhouses, either on brick or lathed walls. Yours,

J. H. CAMPBELL.

CANONSBURG, PENN., Oct. 13, 1877.

[Unquestionably the best kind of blackboard is a thin slab of slate rubbed smooth, and fixed firmly to the wall; when this is thought too expensive, the best substitute we have to suggest is a coating of what is called slate-paint, on the wall, which, for durability's sake, had better be laid on one of the hard-setting cements, — Keene's, or the Teil cement, for instance. Perhaps some of our readers will offer other suggestions. — EDS. AM. ARCHITECT.]

THE METRIC SYSTEM. — The metric system was adopted by Belgium, in 1801; by Holland, in 1819; by Greece, in 1836; by Italy and Spain, in 1859; by Ecuador, Brazil, Peru and Chili, in 1860; by Portugal, in 1868; by the German Empire, and by Columbia and Venezuela, in 1872; by Sweden, in 1876; the Argentine Confederation and Uruguay have also adopted it; in the United States, it was legalized in 1866; and Great Britain, India, and Russia have taken some steps to bring about its adoption.

NOTES AND CLIPPINGS

The second report of Gens. Gillmore and Duane, of the Corps of Engineers, members of the Board to examine the foundation of the Washington Monument, will differ materially, it is said, from their first. It will be remembered that last year the Board concluded that the present foundation of the monument was insufficient to bear the weight of the structure when completed. That opinion was based upon certain measurements made by Lieut. Daniel Kingman, of the Engineer Corps, who found that the sinking of the shaft was so serious as to endanger its safety if greater weight were added. It is now reported that, through no fault of his, the measurement was made from the wrong bench-mark, and that there has been really no such settling as was believed. The Board has agreed to report that the monument may safely be completed, if a certain addition is made to secure the foundation. They report that a strong wall should be built around the foundation, from the surface to twelve feet below the present walls, and at least six feet distant at the corners of the structure, and curved or bowed so that the centre of the wall on each side shall be at least twelve or fifteen feet from the monument. The space between the wall and the monument they propose to fill in with a strong concrete of rubble and cement, and believe that this will effectually hold the earth directly underneath the shaft so that it will be firm, and will not slide or sink. The report will be submitted exactly as it was left by the late Col. Kurtz, including his alterations and interlineations.

Making Holes in Glass. — There are various methods. One which requires some dexterity, and succeeds only in experienced hands, is to use two sharp steel points. Put one in a vise, point upward; lay on this the glass to be perforated, and place the other steel point over it, and strike it gently with a small steel hammer. If the glass is of good quality, you will soon splinter out a piece so as to make a hollow, which, with care, you may deepen and enlarge until you have penetrated through; but be careful at the last moment. If you want to make a hole in a bottle, fill it well with heavy fine sand, and work outside with the steel point. Another method is to use a steel drill lubricated with thick turpentine spirits, which you may obtain by mixing the ordinary spirits with Venetian turpentine, or dissolving a little rosin in the same. Do not press the drill too much; if in good condition, the turpentine will make it cut almost as well as it will cut brass or iron. A third method is with a diamond drill, which will cut any thing. A fourth method is to use a blunt piece of very soft iron, and put diamond-dust on it; this will become embedded in the iron, and so grind the glass most effectively. A fifth method, especially adapted for large holes, is to place a piece of copper tube on a lathe, and use oil and fine emery in its open extremity; this will become embedded in the copper, and it will grind a circle in the glass, which, going deeper and deeper, finally cuts out a disc a little smaller than the interior diameter of the tube; but when you are half way through, begin on the other side also, so as to avoid, if possible, splintering, when going through from one side only.

Strange Phenomenon in a Well. — Situated about four miles south-west of Clintonville, Venango County, is a well which, for volume of production, surpasses any thing yet discovered in that county. The well was completed upward of a month ago. No oil was found; but an immense gas-vein was encountered at the place where oil was expected. Before abandoning the well, the owners resolved to draw out the casing. This was attempted in the usual way, but the casing stuck about a foot above its former resting-place. As it was elevated to its present position, the fresh water from the upper part of the hole rushed into the well at the bottom of the casing in great quantity. As it did so, the gas raised it to the surface of the earth after sending it forty feet above the top of the derrick. There it continues to gush, and may for all time. It is estimated that at least twenty thousand barrels of water are thrown out daily. It is truly a remarkable phenomenon.

Remarkable Clocks. — In the sixteenth century there was at Gaza a clock on which the hours were represented by twelve brass eagles ranged in a row, and each holding a crown. At the end of the hour a silver figure which impersonated Hercules issued from a little temple, and received upon its brow one of the crowns. How the eagle recovered the crown is not stated. This is not so remarkable as a clock which was one of the three wonders of Mechonar, in Arabia, the residence of the Caliphs of Tlemoen (?). The principal feature of the clock was a silver bush at the foot of a wall, also of silver, which supported a colonnaded wall pierced by twelve doors of a like size, and two larger doors. At the top of the bush a bird covered with its wings two nestlings, while a serpent issuing from the foot of the bush was ready to mount to the nest. The whole composition was topped by a sphere, which represented the moon, and which moved in a circle in conformity with the phases attributed to it by the Arabic astronomy. At the end of the hour soft music was heard; two eagles, each holding in its beak a copper ball, flew out from the two large doors, and dropped the ball into a silver bowl with a hole in the bottom. Urged by their weight the balls disappeared within the clock; and immediately the serpent, vitalized by the action of a spring touched by the balls in their descent, moved upward, hissing as he went, to attack the nest. The mother bird fluttered its wings and uttered cries of distress; whereupon the twelve doors opened, and from each came forth a female figure bearing a book, upon whose pages were written an Arab poem in honor of the Caliph.

Spiral *versus* Spinal. — At a recent meeting of the Boston Society of Architects, a member repeated the remark of a lady, who had gravely stated to him that of all modes of ascent she preferred a *spinal* staircase. This called forth from the Treasurer, the comment that the lady had only been misunderstood, for she had meant, probably, a back staircase.

Imitation Terra-Cotta. — The *Magasin Pittoresque* gives the following original recipe by which, it is said, plaster casts may be made to imitate terra-cotta ware with great fidelity. The following colors are necessary: brick red, lamp-black, zinc white, and yellow ochre, all in powder. The object to be treated is first carefully rubbed over with "0 0" sand-paper, so as to remove all roughness of the surface or ridges indicating where the parts of the mould have been joined. The mixed color consists of yellow ochre two parts, brick red two parts, and black one part. These are well rubbed together. Then three parts of zinc white are separately mixed with a little milk to a paste. All the ingredients are then combined in a mortar with eight or ten parts of milk, and the resulting mixture is passed through a fine sieve to remove any particles of the white. A soft brush is then used to spread the stain over the object, care being taken to lay it on evenly. After twenty-four hours' drying, a second coat is applied. When the article is completely dry, rubbing with the finger will eliminate brush-marks.

Sawdust in Mortar. — The following successful experiment is reported. A Frenchman is to be credited with a discovery that if mortar is likely to peel off, the tendency can be prevented by substituting sawdust for hair in the original mixture. He had previously tried in vain to make mortar that would stay in place on a building exposed to damp winds near the sea-shore. After frequently renewing the mortar in the old way, he tried the use of sawdust in place of hair, and was quite successful. The sawdust had been thoroughly dried, and its coarser portions were removed by sifting.

Fires in Chicago. — During the past month there were thirty-nine fires and four false alarms. The causes were: Accidents, 2; carelessness, 5; children, 3; defective chimneys, 4; gas-explosion, 1; incendiary, 4; lamp-explosion, 4; spontaneous combustion, 1; rats with matches, 1; kettle boiling over, 2; unknown, 1. The total loss was $23,620, — $13,327 on goods, and $10,923 on buildings. The total insurance was $102,800. The largest fire occurred in the Union Planing-Mill Company's mill, and the loss was $8,570 on both goods and building.

A Building Association, limited. — A novel building association has been formed in Mechanicsburg, Penn. It embraces a membership of but five persons; viz., a lumber-dealer, a brickmaker, a carpenter, a mason, and a plasterer, each individual member furnishing his portion of the necessary material and mechanical labor for the erection of five houses, each taking a house as a remuneration for his services.

Archæological Discoveries. — At Trier, the ancient *Augusta Trevirorum*, which was one of the last places captured from the Romans by the German Franks, a great number of marble slabs, fragments of statues, and frescos, have been brought to light by recent excavations. Near Trier is a colossal Roman family monument, 72 feet in height, which is known as the Igel column.

A Deep Well. — A proposition was lately brought before the Brighton (Eng.) Board of Guardians to abandon the well-known Warren Farm Well, one of the deepest dug-wells in the world. It was commenced on the South Downs above Brighton in 1858, and after four years' persistent digging, water was reached at a depth of 1,285 feet, the shaft being six feet in diameter down to 400 feet, and four feet for the remainder. The operation, which cost between £6,000 and £7,000, and was watched with the greatest interest by geologists, was carried out with a view to supplying the industrial schools with water, and thus saving the town the cost of such a supply from the established water company.

House Ventilation. — A series of experiments has just been made in Liverpool in a new method of house ventilation, which has been patented by Mr. John Westmoreland, of that town. The ventilator is an iron frame, which fulfils the double purpose of a ventilator and hearth-bearer. The object obtained is the rapid extraction of air from its position in the ceiling of a room. In the presence of the company interesting experiments were made; and, with the windows and doors closed, by the application of an anemometer to the extraction flue, it was shown that it registered 560 cubic feet of air per minute, which was equivalent to changing the entire atmosphere of the room every six minutes. With the door open, allowing greater inlet, the anemometer registered 1,440 feet per minute, equivalent to changing the entire air of the room in three minutes. In this room a brisk fire was burning at the time. There were other experiments made in the library without a fire, when the anemometer registered 320 cubic feet per minute, being equivalent to changing the air of the room every five minutes.

More Bad Work. — The Philadelphia *Bulletin* says that Peoria is another Illinois town having a court-house and a dome. The architects recently ordered an investigation into the condition of the walls. The dome wall was found to be a shell from four to eight inches thick, the interior being filled with débris, brickbats, and lumps of stone and mortar. The main walls, which were from two to three feet thick, were found to be packed with rubbish, most of the brick being so soft that it could be sliced with a knife or crushed with the fingers.

Christ Church, Boston. — One of the objects of interest in the city is the old Christ Church on Salem Street, the oldest church edifice in Boston. Among the old-time relics in the church are the Bible, prayer-books, and silver given by George II. in 1733, which are still in use; a chime of eight bells brought from England in 1744, and which is the oldest chime in this country; the figures of cherubim in front of the organ; and the chandeliers, taken from a French vessel by a privateer, and presented to the church in 1746.